Laidlaw, Tina

From: Suplee, Mike <msuplee@mt.gov>
Sent: Friday, January 31, 2014 2:01 PM
To: Laidlaw, Tina
Cc: Kron, Darrin
Subject: RE: another question about the binomial test

Hi Tina;

I will look into whether or not our exceedence rate e values are off by one or not. We have gone through this spreadsheet twice with our statistician, so I doubt it, but I will investigate. It may take some time.

In your email below you refer to a "proposed" approach; what are you referring to there?

Thanks, Mike

From: Laidlaw, Tina [mailto:Laidlaw.Tina@epa.gov]
Sent: Friday, January 31, 2014 1:53 PM
To: Suplee, Mike; Kron, Darrin
Subject: FW: another question about the binomial test

Mike and Darrin,

See Lester's analysis below. I wanted to make sure we didn't have any concerns with the proposed approach and we don't. The only thing we would like MDEQ to evaluate and correct is the allowable exceedance value. See the highlighted text.

Let me know if you have any questions. If you want to chat with Lester directly about his analysis, I'd be happy to set something up.

Tina

From: Yuan, Lester
Sent: Friday, November 15, 2013 11:37 AM
To: Laidlaw, Tina
Subject: RE: another question about the binomial test

The approach is fine, but the implementation document tells us to use the "e" column as the number of allowable exceedances, when in actuality the number of allowable exceedances should be e-1.
Lester

Lester L. Yuan, Ph.D.
Office of Science and Technology, Office of Water, US EPA
Washington, DC 20460, Mail Code 4304T
Phone: 202-566-0908

From: Laidlaw, Tina
Sent: Friday, November 15, 2013 1:36 PM
To: Yuan, Lester
Cc: Santell, Stephanie
Subject: RE: another question about the binomial test

Thanks Lester

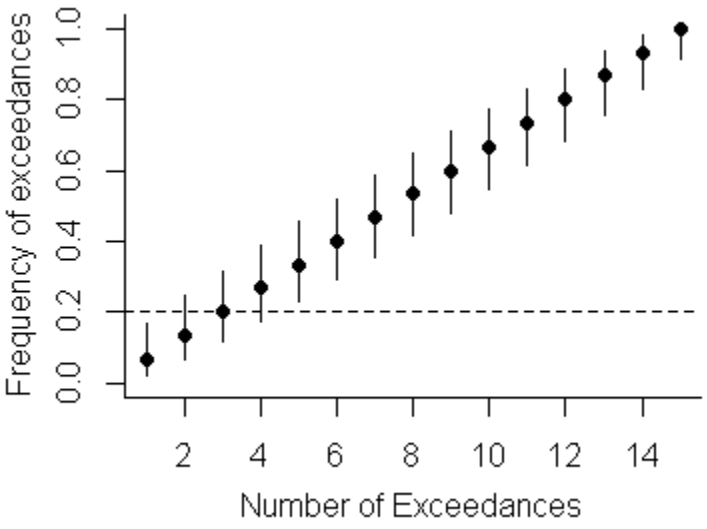
From: Yuan, Lester
Sent: Friday, November 15, 2013 8:46 AM
To: Laidlaw, Tina
Cc: Santell, Stephanie
Subject: another question about the binomial test

Hey Tina,

I just noticed on Page 14 of MT's assessment methodology document that column "es" in the non-compliance spreadsheet is the *allowable* number of exceedances. Here's the text excerpt:

Both tests (Binomial, T-test) will produce a result (PASS, FAIL). For the Binomial, you need to compare the allowable number of exceedances shown by the test ("es", found in column D) to the actual number of exceedances manifested by your dataset. For the T-test, you will need to enter the dataset into the spreadsheet along with the criterion concentration against which the data are being compared. If the assessment reach complies with a test, the result is PASS; if the assessment reach does not comply with a test, the result it FAIL.

However, in my understanding of the spreadsheet, "es" is the point at which a site fails the binomial test, and therefore es-1 would be the number of allowable exceedances. Here's a plot that helped me understand their approach:



They are interested in identifying sites that exceed the stated nutrient criterion more than 20% time with a stated level of confidence of 20%. In the plot above, I assumed that 15 samples were collected, and plotted the estimated frequency of exceedance for each of the shown number of observed exceedances. The vertical lines show the 60% confidence limits on the estimated frequency (which correspond to a one-sided 20% confidence limit). So, when we hit 5/15 exceedances, we are 80% confident that the frequency of exceedance is greater than 20%.

In MT's spreadsheet, 5 is listed as the allowable number of exceedances for 15 samples, and I think they actually mean 4.

Lester

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